Energy Storage Design Project

Stakeholder Feedback & IESO Response from July 23rd Webinar

Following the July 23rd public webinar on the Energy Storage Design Project, the Independent Electricity System Operator (IESO) received feedback from participants on whether the State-of-Charge (SOC) Management Lite proposal offers a pragmatic solution for the participation of energy storage in the IESO-Administered Markets in the long-term.

The IESO received feedback from:

- Canadian Renewable Energy Association (CanREA)
- EDF Renewables Canada
- Electricity Distributors Association
- Ontario Power Generation
- TC Energy

This feedback has been posted on the Energy Storage Advisory Group webpage.

Notes on Feedback Summary

The IESO appreciates the feedback received from stakeholders. The IESO has provided a summary table below, which outlines specific feedback or questions for which an IESO response was required at this time. It should be noted that feedback was also sought on the SOC Management Lite Proposal following the May ESAG meeting. Stakeholder feedback from the May meeting is available here. In order to gain a fulsome perspective on the feedback provided by stakeholders on this proposal, readers are encouraged to review both documents.

Stakeholder comments and IESO responses

Topic	Feedback	IESO Response
State-of-Charge (SOC) Management: The IESO has proposed an SOC Management Lite approach that will provide the same market access as a generator and account for the practical operating realities of a storage facility	Several stakeholders noted that they appreciated the additional details on the SOC proposal presented at the July meeting. Three stakeholders provided support for the SOC proposal at this stage of the design effort, noting: • EDF thanks the IESO for providing greater clarity on the SOC Management Lite design proposal. As a preliminary design decision, EDF supports the proposal. • OPG supports the IESO's recommendation of SOC Management Lite approach. • TC Energy believes the preliminary design presented by the IESO for SOC-Management Lite is a pragmatic solution to integrate energy storage resources into the IESO-Administered Markets (IAM). At this stage of the design process, TC Energy supports the direction and framework the IESO is following, including mandatory state of charge telemetry and the prevention of infeasible dispatches.	The IESO appreciates the support provided by stakeholders for this proposal and the level of engagement stakeholders exhibited in developing and exploring the proposal.

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	Some stakeholders identified a desire for additional details and continued discussion on SOC management in future design discussions. • EDF stated that there are a number of areas where further details will be required. For example, when in the scheduling process the SOC management constraints will be applied is important. During the day-ahead scheduling process, there is an error margin in the IESO's demand forecast. If the SOC management restricts the schedules of energy storage resources too early the flexibility benefits of energy storage will be limited. Details on the parameters and application of the SOC management are required. • CanREA noted the need to work through details and nuances during the implementation phase. For example, the SOC-lite approach in the day-ahead market (DAM) could restrict storage scheduling at a time when there may be greater forecast error and thereby limiting the ability of storage to respond in real-time. The IESO forecasts 85% of demand (i.e., non-dispatchable load) and has acknowledged that DAM forecasts have greater error	At this time, the IESO believes that the SOC-Lite proposal is the SOC management option that best adheres to the design principles of the SDP. Nonetheless, the IESO agrees that SOC management and the other design proposals that have been stakeholdered through the SDP will be subject to continued, more detailed discussion in the future. In September, the IESO will publish a long-term design vision that codifies design discussions that have taken place to date on the long-term vision for storage participation. This document will provide the foundation for future energy storage design and implementation efforts. Future design efforts may be influenced by practical experience in other jurisdictions and experience gained through the implementation of Market Renewal. The IESO does not expect that the SOC Management Lite approach will restrict flexibility for storage resources between day-ahead and real-time. The IESO looks forward to future, more detailed design discussions that will help to further clarify this point. Through the SDP, the IESO has focused on developing a long-term design vision that provides consistent treatment for a broad range of stand-alone storage facilities. However, if there are

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	compared to pre-dispatch and real-time forecasts). The issue can be resolved by either loosening the SOC-lite scheduling restrictions in the DAM or allowing storage to adjust schedules that are not feasible in DAM. • OPG would prefer the design include optionality to have Self-SOC management options for Energy Storage Resources (ESRs) that are complex and would benefit from management solely by MPs. Exploring options such as allowing 'Infinite SOC' where it enables a facility to monitor and control their own parameters through market offers and bids. EPRI had previously presented that other jurisdictions have multiple SOC Management options available to participants that were dependent on the ESRs technology needs. • TC Energy continues to recommend that further enhancements and evolutions be considered. First, TC Energy believes that a final decision on SOC management selection at this stage of the storage design process is premature, and that the IESO should continue to explore further enhancements. For example, the IESO could consider	compelling reasons why the design may not be appropriate for a uniquely complex facility, the IESO remains open to future discussions on how best to apply the design to such facilities.

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	additional features that would allow for close to ISO-SOC Management for large critical storage facilities. Some stakeholders identified the need for further details on future storage integration efforts and provided perspectives on how best to proceed. • The IESO mentioned that the IESO SDP enduring storage vision will not be part of the MRP, and as a result there will be a period during MRP "go-live" where there will need to be a "2nd Interim Design", to ensure the framework implemented during the Interim Period design is not lost. The IESO should provide clarity around what will be included in this "2nd Interim Design", and if there is a risk that the Interim Design changes that are currently going though the Market Rule/Manual review would potentially not continue through and beyond the MRP process. OPG believes the Interim design changes should be able to be easily implemented into MRP, with minimal disruption, as it does not require any significant tool changes or adaptations to the DSO or MRP design.	The IESO appreciates stakeholder feedback on next steps for storage integration beyond the scope of the SDP. As stated at the July engagement meeting, the IESO is committed to ensuring that the progress made with the interim design will not be lost at Market Renewal go-live. As a result, the rules and manuals developed for the interim period through the SDP will be amended prior to the implementation of Market Renewal to reflect the new energy market design. The IESO is considering timelines and approaches for undertaking this work as part of it's business planning process. The IESO agrees that complete high-level and detailed designs for the long-term design vision will be required prior to implementation. The design vision developed through the SDP provides a path forward for key elements of the long-term design and records the rationale for those decisions. Future design work will build on this foundation and will revisit the proposals as appropriate based on new information that may emerge. Through

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	• It would be helpful at this stage for the IESO to clearly lay out the next stages in the storage design process. At a high level, and borrowing from the Market Renewal Program (MRP) approach, TC Energy views the decisions on SOC Management and other long-term design decisions as "Preliminary Design Decisions". The next stage would be to prepare and stakeholder a High-Level Design (HLD) that would detail the tool selection, market participation requirements and integration needs to fit with the redesigned IAM through MRP. As with MRP, preliminary design decisions in the Storage Design Project (SDP) could be adjusted, amended or reversed in the transition to the HLD, depending on stakeholder feedback and analysis, as well as the IESO's own analysis. From there, the IESO could consider detailed design decisions that would describe how the market design, rules and manuals will change to meet the objectives and conclusions of the SDP. The MRP has operated for over 3 years and a similar timeline may be required to implement the changes discussed in the long-term SDP. If	its business planning process the IESO is currently considering a range of potential future market enhancements, including the long-term storage design.

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	this is the case, the IESO should establish a timeline as early as possible to manage expectations with stakeholders. In addition, and perhaps more importantly, the timeline should be established soon to target alignment with the conclusion of the implementation of MRP. Waiting for MRP to conclude to start the next stage of SDP will needlessly delay fundamental design changes that are required to fully integrate energy storage resources into the IAM. The conclusions of the long-term phase of the SDP in 2020 is an excellent starting point, but further work is required in 2021 and beyond to implement the changes after MRP has concluded. • In EDF's view, the long-term phase of the SDP is equivalent to the preliminary design phase. The IESO must establish a timeline and process for the proceeding stages to implement the design decisions discussed in the SDP. As the IESO and stakeholders proceed through the process, adjustments and amendment to the design decisions may be required as greater details and issues are discussed. EDF strongly recommends that the IESO establish a similar process as MRP	

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	to ensure implementation for energy storage is timely. In particular, the implementation of storage design decisions should proceed in step with the MRP, albeit delayed compared to the MRP timelines. This way, the storage process can incorporate MRP implementation into the storage design decisions.	
Other/General	Stakeholders provided additional feedback, discussing the business case for the various SoC options, considerations for the inclusion of hybrids, as well as ABB vendor capabilities. <u>Business Case</u> • While the EDA appreciates the additional detail provided during the webinar with respect to the application of the proposed SOC-lite approach, and in response to the feedback that the EDA provided to the IESO in June 2020, we note that the IESO has declined to provide further analysis related to either risk assessment or to the alternative processes for managing risk associated with infeasible dispatch instructions. We continue to seek this additional detail and analysis so that the implementation of the long-term design will achieve the desired outcomes.	As communicated previously, the IESO does not intend to undertake the additional analysis requested by the EDA at this time. At the July stakeholder meeting, the IESO provided additional information outlining the rationale for its SOC management proposal and how the proposal aligns with the principles set out for the project. The IESO believes the level of detail and analysis provided in July is appropriate for this stage of design work. A more detailed assessment of design features and costs will be required at a future stage of the long-term storage design effort.

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	<u>Consideration for hybrids</u> • CanREA continues to be concerned that the IESO's proposed long-term vision does not contemplate the role of hybrid energy systems or energy storage co-located with variable renewable energy generators. We therefore consider the IESO's proposed long-term vision to be incomplete. Excluding hybrid energy systems or co-located projects at this stage means that analysis has not been performed on the suitability of the SOC-lite approach for such resources. • The IESO has indicated that it will be preparing a final report with the long-term design proposal for energy storage later this fall. CanREA urges the IESO to leave room for additional analysis to shape the long-term design. As demonstrated by FERC's recent technical conference, there is significant ongoing discussion with respect to the integration of hybrid resources. Given that the IESO is not planning on implementing the long-term storage design until following the implementation of MRP, the IESO would be remiss in omitting	The IESO agrees that hybrid energy facilities are an area that will require increased attention over the coming years. As noted above, the IESO is currently considering a range of potential future market enhancements through its business planning process. The long-term storage design vision that will be published in September will be focused on the scope of work set out for the SDP and will provide a record of the proposals that were developed through the project and the rationale for those proposals. The document will provide the foundation for future work on the long-term storage design. The long-term design may also influence and be influenced by future work related to hybrid energy facilities.

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	consideration of hybrids in the long-term storage design. <u>ABB capabilities</u> • OPG is pleased to hear that the MRP vendor ABB, will have the functionality to implement SOC Management Lite, and the new DSO will be able to automatically manage overlapping offers/bids and changes in the mandatory window with regards to SOC for Energy and OR, and continuous offer curves. In order to facilitate the most effective solution, the IESO should provide clarity and transparency with regards to their discussions with ABB, and inform participants exactly what design principals are readily available with the vendor, and what capabilities the vendor has with regards to integrating ESRs in the market. MPs should have a sense of which design principals still need to be developed/created, as this will give MPs a sense of clarity on which design proposals have a high chance for success in the Long-Term Storage Design.	The IESO has engaged with ABB, the software vendor selected through the Market Renewal – Energy program, to understand its storage solutions and to assess the implementabililty of the various SOC management options. While the long-term design proposals will be subject to further testing and validation in the future, the IESO believes that the SOC Lite proposal it has brought forward provides a practical vision for the future with high potential for timely and cost-effective implementation. The IESO appreciates the interest in greater detail regarding ABB's storage capabilities and expects that this is an area that will be explored in more depth at later stages of the long-term storage design effort.

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